

REVIEW OF THE RACES OF THE SPIKE-HEELED LARK, *CERTHILAUDA ALBOFASCIATA* LAFRESNAYE

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INTRODUCTION

In 1956, the List Committee of the South African Ornithological Society asked me to make a preliminary investigation on their behalf of the races of *Certhilauda albofasciata*. This paper is the result of work begun for that purpose.

The races of *Certhilauda albofasciata* have been most recently reviewed by Meinertzhagen (1951) and, in respect of the western forms, by Macdonald (1953). These two reviews do not agree with one another, though both recognize fewer races than does Roberts (1940) and, following him, Vincent (1952). The comparative data are set out in Table I. Neither Meinertzhagen nor Macdonald defines the ranges of the subspecies they recognize with precision (though this only applies to the eastern races in Macdonald's case), but it is clear that in some cases these ranges do not correspond to the joint ranges of the various 'Roberts-recognized' subspecies fused in the synonymy. The problem is not rendered any easier by doubts as to the correct names to be applied to the different races; and, in particular, as to which form should be called *C. albofasciata* Lafres. The type of *C. albofasciata* is now at Harvard. The locality is said to be 'Cape of Good Hope', but, apart from the fact that there is no record of the species occurring within 70 miles of the Cape, this locality was given at that time to a wide, but indefinite, area, covering much of the present Cape Province. Comparisons of the type specimen with others of known origin suggest that it belongs to the population found in the north-central and north-eastern Cape and southern and eastern Orange Free State; and Macdonald has recently (1958) proposed Deelfontein as the type locality.

Andrew Smith described *garrula* in *Ill. Zool. S. Afr., Aves*, 1846, pl. 106. In the description, he gives a reference to a prior description of his own in

Proc. S. Afr. Inst., 1833. These Proceedings are contained in the *S. Afr. Quart. Journ.* and no such description appears in the period 1830-6. Smith gives the range as 'the northern districts of the Colony', which might be almost anywhere north of the Olifants River and Little Karoo. Macdonald (1953), pointing out that Smith's figure is of a darker bird than that shown by Lafresnaye, has accordingly applied the name *garrula* to the dark, south-western population and fixed Vanrhynsdorp as the type locality. Actually, the colouring of Smith's plate appears to me so unlike any *Certhilauda albofasciata* specimen I have ever seen that I think it might have been wiser to have rejected the name altogether as indeterminable; but to do so now would cause a great deal of confusion and I propose to accept it.

It must be noted, however, that the consequences of accepting these findings of Macdonald's are that some of the birds called *albofasciata* by Roberts, Vincent and Meinertzhagen must now be called *garrula*; and some, at least, of the birds called *subpallida* or *alticola* by these authors now become *albofasciata* (allowing for differences in recognition of subspecies).

ACKNOWLEDGEMENTS

The total number of skins assembled for the present study was 374. I am much indebted to the Directors and staff of the following Museums for the loan of material: British Museum (Natural History), London; Coryndon Museum, Nairobi; Durban Museum and Art Gallery; East London Museum; Kaffrarian Museum, King William's Town; National Museum of Southern Rhodesia, Bulawayo; Port Elizabeth Museum and Snake Park; and the Transvaal Museum, Pretoria. I am also indebted to Messrs. J. D. Macdonald and C. M. N. White for giving me their views on some of the problems raised, though they must not be held responsible for any of the opinions expressed here; and to my colleagues of the List Committee (Messrs. R. H. N. Smithers, J. Vincent, P. A. Clancey and R. Liversidge) for much helpful criticism of my initial review. I must extend my sincere thanks, too, to Mr. Smithers and Mrs. B. P. Hall for making available the fine series of Spike-heels collected in southern Bechuanaland by the joint British Museum-National Museum expedition to that area, as noted below; and to Mr. P. A. Clancey for a preview of the material collected by the Durban Museum in the northern Cape.

I am most grateful to Mr. A. N. Rowan for statistical treatment of the measurements; and to Mr. E. H. J. Middlemiss for information on the geography and vegetation in the Johannesburg-Pretoria area, where variation among Spike-heels is so confusing.

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REVIEW OF THE MATERIAL

The west coast from the Olifants valley to Little Namaqualand and inland as far east as Calvinia is occupied by the race *garrula* Smith, a dark bird, notably darker and redder above than *albofasciata* and much darker below.

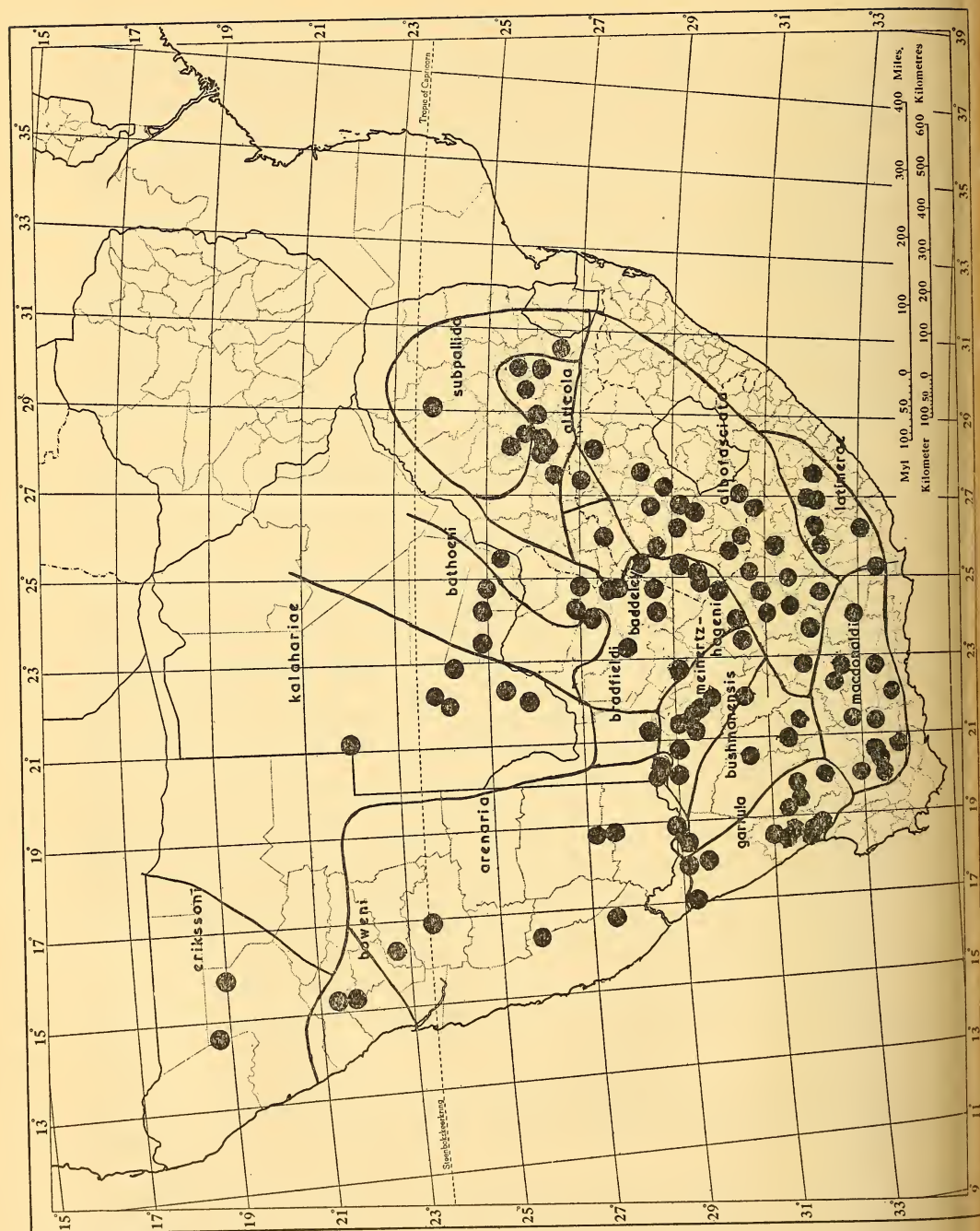
To the south and east of this, from Karoopoort, in the Ceres District, east through Beaufort West and southern Aberdeen to Bedford, is a race, greyer than *garrula* and colder and more vinaceous below. This race is without a name and I propose to call it *macdonaldi*, after Mr. J. D. Macdonald, who first pointed out that it was distinct. East of this, the birds become redder and lose the cold tone. They most closely resemble the Griqualand West series, from which they are separated by the lighter nominate form; but they are not so dark as those northern birds. I name them below *latimerae*, after Miss M. Courtenay-Latimer, whose collections from the Cape Province have done so much to clear up the races in that area.

Inland from the coast in the north-west Cape, three races have been described, *calviniensis* (Roberts), *bushmanensis* (Roberts) and *meinertzhageni* Macdonald. Macdonald places the first two in the synonymy of *garrula*; Meinertzhagen, who does not refer to *garrula*, puts the first as a synonym of *albofasciata* and the second of *boweni*.

To take *calviniensis* first, I have seen ten skins from Calvinia itself, besides one from 50 miles south and another four from Lokenburg, west of Calvinia. All these are *garrula*. But the East London and Durban Museums' series from Brandvlei, some 80 miles north-east of Calvinia, are quite different. Now Roberts's type locality for *calviniensis* is given as '35 miles east of Calvinia on the Brandvlei road'; and the phrase I have italicized is omitted from the citation by both Macdonald and Meinertzhagen. The omission is important because, in point of fact, the road from Calvinia to Brandvlei, though it starts by going east, swings round through 90° and ends by going north. At 35 miles, it has already started this swing; and two Transvaal Museum specimens from the type locality are much closer to the Brandvlei birds than to *garrula*. They are, however, somewhat yellower and less pink than any of the Brandvlei series, but this may be because they are in worn plumage.

The type locality of *bushmanensis* is 'border of the Bushman Flats and Little Namaqualand on the road from Goodhouse to Steinkopf'. I have seen the type, which can be matched by examples from Brandvlei. I am of the opinion that only one subspecies can be recognized from this area. It is singularly unfortunate that both the described races are from the edges of the range, but *bushmanensis* has page priority and is slightly less inappropriate, so I propose to use it.

To the north-east of *bushmanensis*, there are two skins from Pofadder and five from the Putzonderwater and Britstown areas in the East London collection and four Transvaal Museum skins from Putzonderwater and Vanwyksvlei, in



Approximate distribution of the races of *Certhilauda albofasciata* Lafresnaye. Each dot represents a locality from which one or more specimens has been examined. Unnamed areas—specimens indeterminate (see text).

which the intensity of the central dark streak in the back feathers is considerably reduced and the red tint of the rest of the feather is much deeper than in any other examples known to me. In the first of these characters, they approach *bradfieldi* of the region west of Upington, but they are much redder; while the underparts are dark—darker than either *bradfieldi* or *bushmanensis* and as dark as *garrula*. These birds are *meinertzhageni* Macdonald. In a series of eight Durban Museum skins from Vanwyksvlei, however, only one agrees with *meinertzhageni* and the others are *bushmanensis*.

Passing north from the ranges of *bushmanensis*, *meinertzhageni* and *garrula*, we come to the ranges of three more named races. On the east, to the west of Upington, is *bradfieldi* (Roberts), a subspecies of very restricted range. I have seen eight skins of this bird, all from 20 miles west of Upington and forming a well-marked and compact group with the dark centres of the back feathers much reduced, so that the effect is of a rufous bird, though, in series, yellower and less red than *meinertzhageni*.

To the west of *bradfieldi* are two named races, *barbiensis* (Roberts) and *arenaria* Reichenow. I am unable to find any distinction between them and agree with Macdonald and Meinertzhagen that *barbiensis* is a synonym. *C. a. arenaria* is paler, with narrower dark centres to the back feathers, than *garrula* to the south of it: but darker than *bradfieldi* above, though lighter below.

North-west of the range of *arenaria* is *boweni* (de Schauensee), of which *namibensis* (Roberts) has been accepted by practically everybody, including its author (but not, oddly enough, by Meinertzhagen), as a synonym. It is a pale, sandy bird, with wide light margins to the feathers of the back and the dark centres reduced and lighter or almost absent. It is also smaller.

Still further north occurs *erikssoni* Hartert, the lightest race of all, though the dark centres to the back feathers are more distinct and much darker than in *boweni*. The birds of the area east of *arenaria* and *erikssoni* have been described as another race, *kalahariae* O.-Grant. Meinertzhagen fuses this race with *erikssoni*, saying, 'I believe *kalahariae* to be the grey phase of *erikssoni*'. Only three skins of *erikssoni* were available to me, but I was fortunate to have at my disposal the long series of *kalahariae* collected by the British Museum-National Museum expedition to southern Bechuanaland in 1957, and was later able to see ten more skins of *erikssoni* in the British Museum collection. These certainly do not support Meinertzhagen's belief.

The British Museum-National Museum expedition also revealed the presence, east of the pale *kalahariae* and west of the much darker Griqualand birds, of a population resembling *arenaria* but less heavily streaked; and Liversidge has recently collected two similar birds from between Stella and Vryburg. They constitute the race *bathoeni* Smithers and Paterson.

East of these races and north of *latimerae* and *macdonaldi* occurs a form, paler and less rufous than *macdonaldi* though darker than *arenaria* and much darker than *erikssoni*. This form Macdonald has shown must be called *albofasciata*. Its

range extends north over most of the Orange Free State and east, according to Macdonald, to northern Natal (no Natal skins were available to me). Westward, eight out of nine Durban Museum skins from Riverton, Kimberley, belong to this form, though Bulawayo and Cape Town skins from the Kimberley area agree with the next race.

West of this, from De Aar north to Kanye and west to Kuruman, the birds are darker and show an approach to *alticola* (with the exception noted below). They represent *baddeleyi* Clancey. From the Vaal valley, separating the range of *baddeleyi* from *alticola*, come five quite different skins. Two, from Christiana and Wolmaransstad, are yellowish brown; the other three, from Kroonstad, are a cold grey. What the status of these five is it is impossible to say in the absence of more material, but one of the National Museum skins from Riverton is a near match to the first two.

From the Witwatersrand-Pretoria area, two races have been described, *alticola* (Roberts) and *robertsi* Macdonald. I am unable to distinguish between them. Birds from this area are black and deep rufous above, darker than *griquensis* and much darker than *albofasciata*. But, as Macdonald has pointed out, birds from Fountains Blue and Zwartkops, between Johannesburg and Pretoria, are quite distinct, since they lack the dark centres to the feathers and are wholly dark rufous. They are old skins and I do not propose to name them, but the position in this area can only be described as fantastic. On a practically straight line from Boksburg through Pretoria to Zoutpan Road, we have the following forms succeeding each other:

Boksburg: *alticola* (type locality).

Modderfontein (c. 11 miles): *subpallida*.

Fountains Blue (c. 6 miles) and Zwartkop (c. 20 miles): rufous birds, as noted above.

Fountains (c. 7 miles): *robertsi* (type locality) (= *alticola*).

Zoutpan Road (c. 30 miles): *subpallida*.

I can find no correlation between this distribution and either the vegetation as given by Acocks (1953) or the 1955 geological map.

The extreme north-east of the species' range is occupied, from Zoutpansberg south to near Pretoria and to Lake Chrissie, by *subpallida* (Roberts), lighter above and below than *alticola*, greyer above and less red below than *albofasciata*.

Far to the north of any other form of the species, in central Angola, occurs the very dark *obscurata* Hartert.

SUMMARY OF THE RACES

The forms recognized may be summarized:

1. *Certhilauda albofasciata albofasciata* Lafresnaye, *Mag. de Zool.*, 1836: pl. 85.
Type locality, Deelfontein.

Range: North-eastern Cape Province, most of the Orange Free State and north-western Natal. Meets *baddeleyi* in the Kimberley region, where the detailed delimitation of the respective ranges needs further study.

Moderately pale and not very red.

Average measurements:

- 13 ♂♂: Wing, 90.1 mm. (83-97); tail, 48.5 (44-53); culmen, 23.2 (20-25); tarsus, 25.0 (22-29); hind-claw, 13.8 (11-21).
 10 ♀♀: Wing, 84.0 (81-91); tail, 43.7 (39-52); culmen, 20.3 (18-24); tarsus, 24.4 (22-27); hind-claw, 12.5 (11-15).

Material examined:

South African Museum, 12 (Deelfontein, Hanover, Richmond, Winburg, Middelburg, Vredefort road, Wagenaarskraal); Transvaal Museum, 16 (Dealesville, De Brug, Zastron-Rouxville road, Bethulie, Bloemfontein, Heilbron, Springfontein, Excelsior, Meadows, Rhenosterspruit); Durban Museum, 3 (Elandshoek, Steynsburg); East London Museum, 1 (Elandshoek); Kaffrarian Museum, 1 (Colesberg).

2. *Certhilauda albofasciata macdonaldi* subsp. nov. Type: in South African Museum, Cape Town, No. 20340, ♂, 23 miles north-east of Karooport, Ceres District, c. 33° S., 20° E.

Range: From Beaufort West and Aberdeen to the southern borders of the Karoo. Intergrades with *albofasciata* in southern Victoria West (Wagenaarskraal) and with *latimerae* at Klipplaat, in the Sundays River valley.

Greyer above than *albofasciata* and *garrula*, colder and more vinaceous below.

Average measurements:

- 32 ♂♂: Wing, 90.6 mm. (82-97); tail, 46.4 (40-56); culmen, 23.4 (18-28); tarsus, 25.6 (22-31); hind-claw, 13.7 (10-18).
 21 ♀♀: Wing, 85.5 (78-95); tail, 43.5 (38-55); culmen, 20.3 (17-25); tarsus, 23.4 (20-27); hind-claw, 14.3 (7-18).

Material examined:

South African Museum, 24 (Karooport (type), Beaufort West, Dwyka, Oudtshoorn, Barrydale, Matjesfontein, Laingsburg, Touws River, Klaarstroom, Fraserburg road, Aberdeen); East London Museum, 29 (Beaufort West, Bedford-Grahamstown road, Oudtshoorn, Skietkuil); Durban Museum, 4 (Oudtshoorn, Murraysburg, Skietkuil); Coryndon Museum, 1 (Laingsburg); Port Elizabeth Museum, 1 (Klipplaat—intermediate between *macdonaldi* and *latimerae*).

3. *Certhilauda albofasciata latimerae* subsp. nov. Type: in East London Museum, No. 3235, ♂, Cofimvaba, Transkei, c. 32° S., 27° 30' E.

Range: From the Transkei through Glen Grey, Queenstown and Tarkastad to the Sundays River valley, where it intergrades with the preceding.

Redder than *macdonaldi* above and lighter and less vinaceous below; darker than *albofasciata*; lighter than *baddeleyi*.

Average measurements:

- 5 ♂♂: Wing, 90.0 mm. (88–93); tail, 49.0 (46–52); culmen, 23.0 (21–24); tarsus, 24.6 (23–27); hind-claw, 16.6 (15–17).
4 ♀♀: Wing, 82.2 (80–91); tail, 41.5 (35–47); culmen, 19.5 (18–23); tarsus, 23.2 (20–27); hind-claw, 14.0 (10–15).

Material examined:

South African Museum, 2 (Queenstown, Glen Grey); East London Museum, 5 (Mostertshoek, Cofimvaba (type)); Durban Museum, 3 (Fish River, Tarkastad); Kaffrarian Museum, 1 (Bolotwa).

4. *Certhilauda albofasciata garrula* A. Smith, *Ill. Zool. S. Afr., Aves*, 1846, pl. 106. Type locality, Vanrhynsdorp.

Range: The western Cape from the lower Olifants River to Port Nolloth, east to Calvinia and Springbok.

Darker and redder above than *albofasciata* and much darker below. Redder above and below than *macdonaldi*.

Average measurements:

- 26 ♂♂: Wing, 92.6 mm. (81–98); tail, 47.5 (41–63); culmen, 23.7 (21–27); tarsus, 27.1 (22–30); hind-claw, 14.4 (11–18).
23 ♀♀: Wing, 83.8 (79–92); tail, 46.9 (38–52); culmen, 19.6 (18–24); tarsus, 24.7 (21–28); hind-claw, 13.4 (11–19).

Material examined:

South African Museum, 10 (Liebendal, Springbok-Goodhouse road, Lokenburg, Papendorp, 50 miles south of Calvinia); East London Museum, 16 (Clanwilliam, Clanwilliam-Calvinia Road, Sandkraal, Bitterfontein, Nieuwerust-Bitterfontein Road, Springbok, Calvinia); Durban Museum, 13 (Vanrhynsdorp, Nieuwerust, Nieuwerust-Bitterfontein road, Okiep, Calvinia); Transvaal Museum, 9 (Klaver, Klipfontein, Nieuwerust, Port Nolloth); National Museum, Bulawayo, 1 (Vanrhynsdorp).

5. *Certhilauda albofasciata bushmanensis* (Roberts), *The Ostrich*, 1937: 99. Type locality, border of Bushman Flats and Little Namaqualand, on the road from Goodhouse to Steinkopf, c. 29° N., 18° 30' E.

Synonym: *C. a. calviniensis* (Roberts), *The Ostrich*, 1937: 100.

Range: Bushman Flats and Kakamas south to 35 miles north-east of Calvinia and to Williston.

Lighter and redder above than *garrula* and *macdonaldi*.

Average measurements:

- 15 ♂♂: Wing, 90.7 mm. (85-95); tail, 46.9 (41-52); culmen, 24.1 (20-27); tarsus, 26.2 (23-28); hind-claw, 12.5 (9-18).
 15 ♀♀: Wing, 86.3 (80-94); tail, 43.6 (38-48); culmen, 19.9 (18-24); tarsus, 23.6 (20-28); hind-claw, 11.5 (6-15).

Material examined:

Transvaal Museum, 4 (Bushman Flats (type), Brandvlei, 35 miles east of Calvinia); East London Museum, 19 (Brandvlei, Brandvlei-Kenhardt Road, Williston, Kenhardt, Kakamas-Kenhardt road, Williston-Fraserburg Road, Fraserburg); Durban Museum, 13 (Brandvlei, Vanwyksvlei).

6. *Certhilauda albofasciata meinertzhageni* Macdonald, *Proc. Zool. Soc.*, 122, 1953: 1,000. Type locality, Pofadder, c. 29° N., 20° E.

Range: A narrow strip along the south side of the Orange River valley from Pofadder to Britstown and Vanwyksvlei, where it occurs alongside *bushmanensis*.

Differs from *bushmanensis* in that the central dark stripes of the feathers of the upper parts are considerably reduced and the red tint of the rest of each feather is much deeper. Much redder than *bradfieldi*. Underparts darker than either of these two races and similar to *garrula*.

Average measurements:

- 7 ♂♂: Wing, 92.1 mm. (89-95); tail, 48.1 (46-52); culmen, 23.0 (20-25); tarsus, 25.0 (23-27); hind-claw, 12.0 (11-13).
 2 ♀♀: Wing, 83.7 (83-84); tail, 43.7 (42-46); culmen, 18.0 (17-19); tarsus, 23.0 (21-25); hind-claw, 8.7 (7-10).

Material examined:

Transvaal Museum, 4 (Putzonderwater, Vanwyksvlei); East London Museum, 6 (Pofadder, Putzonderwater, Marydale, Kenhardt-Putzonderwater road, Britstown-Merriman road); Durban Museum, 2 (Marydale, Vanwyksvlei).

7. *Certhilauda albofasciata baddeleyi* Clancey, *Durb. Mus. Novit.* 5, 1957: 43. Type locality, Rietfontein, Griqualand West, c. 29° 15' S., 23° E.

Synonym: *C. a. griquensis* Winterbottom, nom. nud., in Clancey, op. cit.

Range: From De Aar north and west to Kanye and Niekirkshoop and east to Boshoff and Koffiefontein in the Orange Free State.

Intermediate in colouration above between *alticola* and *albofasciata*. Below, rather darker than *albofasciata*, matching *alticola*.

Average measurements:

- 22 ♂♂: Wing 91.2 mm. (86–97); tail, 49.0 (40–56.5); culmen, 23.4 (20–26); tarsus, 26.6 (23–30); hind-claw, 13.2 (10–16).
 9 ♀♀: Wing, 82.4 (79–86); tail, 42.0 (37–47); culmen, 19.5 (18–21); tarsus, 25.3 (24–27); hind-claw, 10.8 (10–12).

Material examined:

South African Museum, 3 (Fourteen Streams, Kimberley, Boshoff); Transvaal Museum, 8 (Barkly West, De Aar, Petrusville, Fourteen Streams, Vryburg, Fauresmith, Kanye, Niekerkshoop); National Museum, Bulawayo, 8 (Riverton, Langley, Kuruman); Coryndon Museum, 4 (Koffiefontein, Luckhoff); Durban Museum, 10 (Riverton, Rietfontein (type)); Port Elizabeth Museum, 2 (Vryburg-Mafeking road).

8. *Certhilauda albofasciata bradfieldi* (Roberts), *Ann. Tvl. Mus.*, 15, 1932: 28. Type locality, Langklip, 60 miles west of Upington, c. 28° 30' S., 20° 30' E. Range: 20–60 miles west of Upington.

Yellower, less red, than *meinertzhageni* but, like it, with the dark centres of the back feathers reduced. Redder than *albofasciata*, lighter above and darker below than *arenaria*, yellower above and lighter below than *baddeleyi*.

Average measurements:

- 6 ♂♂: Wing, 92.0 mm. (89–94); tail, 47.7 (42–53); culmen, 24.3 (22–26); tarsus, 26.0 (25–27); hind-claw, 13.2 (12–14).
 2 ♀♀: Wing, 82.0 (80–84); tail, 41.5 (40–43); culmen, 21.0 (21); tarsus, 24.0 (24); hind-claw, 12.0 (11–13).

Material examined:

Transvaal Museum, 8 (20 miles west of Upington).

9. *Certhilauda albofasciata arenaria* Reichenow, *Vög. Afr.*, 3, 1904: 354. Type locality, Rehoboth.

Synonym: *C. a. barbiensis* (Roberts), *The Ostrich*, 8, 1937: 2.

Range: From the Orange River (reaching the south bank at Aggenys and Bladgrond) north to Windhoek.

Paler above, with narrower dark centres to the feathers, than *garrula*. Darker above and lighter below than *bradfieldi*. Less red above than *bushmanensis*.

Average measurements:

- 13 ♂♂: Wing, 90.0 mm. (86–97); tail, 45.3 (40–51); culmen, 23.2 (21–27); tarsus, 25.3 (22–29); hind-claw, 12.1 (10–15).

- 9 ♀♀: Wing, 81.9 (78-93); tail, 40.6 (36-45); culmen, 18.9 (17-21); tarsus, 23.2 (21-26); hind claw, 11.2 (10-13).

Material examined:

British Museum, 6 (40 miles north of Kleinkaras, Witputs, Lower Barby, 69 miles south of Windhoek); East London Museum, 6 (Kenhardt, Aggenys, Bladgrond, Bladgrond-Kakamas road); Transvaal Museum, 3 (Gobabis, Barby, Karibib); Durban Museum, 5 (Aggenys, 30 miles from Kakamas on Kenhardt road, Bladgrond); Port Elizabeth Museum, 3 (Kenhardt).

10. *Certhilauda albofasciata boweni* (de Schauensee), *Proc. Acad. Nat. Sci. Philad.*, 83, 1931: 5. Type locality, Spitzkopjie.

Synonym: *C. a. namibensis* (Roberts), *Ann. Trans. Mus.*, 14, 1931: 243.

Range: From Swakopmund north to Omaruru.

A pale, reddish-sandy bird, with wide light margins to the back feathers and the dark centres reduced and lighter or almost absent. Smaller.

Average measurements:

10 ♂♂: Wing, 85.8 mm. (81-91); tail, 45.2 (40-51); culmen, 22.2 (21-23); tarsus, 23.7 (21-26); hind-claw, 13.0 (11-16).

8 ♀♀: Wing, 78.0 mm. (75-81); tail, 41.9 (38-44); culmen, 18.4 (17-20); tarsus, 21.8 (20-25); hind-claw, 11.8 (9-15).

Material examined:

British Museum, 14 (Ebony, Wilson's Fountain, Karibib, Okomuhe); Transvaal Museum, 2 (Ebony); National Museum, Bulawayo, 3 (Namib).

11. *Certhilauda albofasciata kalahariae* Ogilvie-Grant, *The Ibis*, 1912: 375. Type locality, Lehututu, central Kalahari.

Range: The Kalahari desert.

Much greyer than *boweni*, the dark centres of the feathers of the back very narrow but blackish. Below, rather darker and more vinaceous.

Average measurements:

25 ♂♂: Wing, 90.4 mm. (83-95); tail, 50.6 (43-54); culmen, 23.4 (20-27); tarsus, 24.9 (22-28); hind-claw, 13.0 (8-16).

20 ♀♀: Wing, 83.5 (75-90); tail, 44.5 (39-53); culmen, 20.8 (18-25); tarsus, 24.2 (21-28); hind-claw, 10.7 (8-14).

Material examined:

British Museum, 1 (Fort Rietfontein); British Museum-National Museum Expedition, 44 (Tsabong, Lochahane, Boshohulu, Tsane, Chawe, Kome, Kakia).

12. *Certhilauda albofasciata erikssoni* Hartert, *Bull. B.O.C.*, 19, 1907: 82. Type locality, Okahokahana, Ovamboland.

Range: The Outjo District and Ovamboland.

Somewhat paler than *kalahariae* above and below; greyer than *boweni*.

Average measurements:

8 ♂♂: Wing, 87.4 mm. (81–95); tail, 44.1 (37–45); culmen, 20.6 (19–22); tarsus, 25.6 (24–27); hind-claw, 13.6 (12–16).

5 ♀♀: Wing, 77.6 mm. (75–81); tail, 40.4 (37–47); culmen, 18.2 (17–19); tarsus, 22.4 (18–24); hind-claw, 11.4 (9–14).

Material examined:

South African Museum, 1 (Okahokahana); British Museum 11 (Kalkrand, Ondonga).

13. *Certhilauda albofasciata bathoeni* Smithers and Paterson (description in the press). Type locality, west of Kakia, B.P., c. 25° S., 24° E.

Range: A narrow strip of grass country in south-eastern Bechuanaland, south to the Stella-Vryburg road, between the limestone country inhabited by *kalahariae* and the Acacia country inhabited by *baddeleyi*.

Darker and redder than *kalahariae*, but much lighter than *baddeleyi*. Most like *arenaria*, but less heavily streaked above.

Average measurements:

5 ♂♂: Wing, 91.8 mm. (86–97); tail, 49.0 (46–53); culmen, 25.2 (24–26); tarsus, 26.0 (24–28); hind-claw, 13.6 (12–17).

8 ♀♀: Wing, 81.9 (80–85); tail, 44.7 (42–47); culmen, 20.8 (19–22); tarsus, 23.9 (22–26); hind-claw, 10.6 (9–13).

Material examined:

British Museum-National Museum Expedition, 13 (53–57 miles east of Kakia); Port Elizabeth Museum, 2 (Stella-Vryburg road).

14. *Certhilauda albofasciata alticola* (Roberts), *Ann. Tvl. Mus.*, 15, 1932: 28. Type locality, Van Dyk Mine, Boksburg.

Synonym: *C. a. robertsi*, Macdonald, *P.Z.S.*, 122, 1953: 1003.

Range: From Potchefstroom east to Belfast and Carolina and north to Pretoria.

The darkest of the South African races, black and dark rufous above; but below, no darker than *baddeleyi*.

Average measurements:

5 ♂♂: Wing, 88.4 mm. (85–90); tail, 44.6 (41–50); culmen, 23.6 (22–25); tarsus, 26.4 (24–28); hind-claw, 14.8 (12–16).

- 9 ♀♀: Wing, 83.3 (75-90); tail, 41.7 (36-50); culmen, 19.8 (18-22); tarsus, 24.4 (21-27); hind-claw, 12.8 (8-16).

Material examined:

Transvaal Museum, 15 (Boksburg, Witwatersrand, Enkeldoorn, Zwartkop, Belfast, Carolina, Fountains Blue, Potchefstroom); Durban Museum, 1 (Witbank); South African Museum, 3 (Zwartkop, between Florida and Roodepoort).

15. *Certhilauda albofasciata subpallida* (Roberts), *Ann. Tvl. Mus.*, 15, 1932: 29. Type locality, Marabastad, Pietersburg District.

Range: From Modderfontein and Lake Chrissie north to the borders of the Bushveld.

Paler above and below than *alticola* and very close to *baddeleyi*, but paler below and yellower, less rufous, above.

Average measurements:

- 4 ♂♂: Wing, 87.2 mm. (86-88); tail, 43.0 (41-46); culmen, 22.2 (21-23); tarsus, 26.5 (26-28); hind-claw, 14.2 (13-16).
2 ♀♀: Wing, 78.5 (78-79); tail, 39.0 (38-40); culmen, 20.0 (19-21); tarsus, 25.5 (25-26); hind-claw, 13.0 (12-14).

Material examined:

Transvaal Museum, 6 (Marabastad (type), Modderfontein, Pretoria, Lake Chrissie, Zoutpan road).

16. *Certhilauda albofasciata obscurata* Hartert, *Bull. B.O.C.*, 19, 1907: 83.

Type locality, Bulu-Bulu, Bihe District, Angola.

Range: The grasslands of central Angola.

Back very dark, the feathers with whitish edges; head black, with rufous margins to feathers; below deep rufous. Hind-claw very long, probably in correlation with habitat.

Average measurements:

- 6 ♂♂: Wing, 86.7 mm. (81-89); tail, 40.3 (37-44); culmen, 21.8 (21-23); tarsus, 25.6 (22-28); hind-claw, 17.3 (16-19).
4 ♀♀: Wing, 80.8 mm. (74-91); tail, 36.0 (32-41); culmen, 19.2 (18-22); tarsus, 24.0 (22-30); hind-claw, 15.8 (13-19).

Material examined:

British Museum, 7 (Bure-bure, Missao de Luz); Hall Collection, 3 (Silva Porto).

In addition, as noted above, the following populations cannot be fitted into any of the above races at present and may prove to be worth naming when adequate material is to hand:

- (a) Birds from Christiana and Wolmaransstad, South-West Transvaal.
- (b) Birds from Kroonstad, northern Orange Free State.

The birds from Fountains Blue and Zwartkops, included in *alticola* above, may also warrant separation.

PROPORTIONS

Macdonald (1953) has shown that the sum of the lengths of the wing, tail and bill can be used as a rough measure of size and that the ratio of the means of these quantities between the sexes changes according to the locality, the females representing 85 per cent of the males south-west of Windhoek, 90 per cent over several other South-West African localities and intermediate elsewhere. Working with average figures for each race, I obtained ratios varying from 88 per cent for *boweni* and *arenaria* to 95 per cent for *macdonaldi*, the pattern roughly conforming to decreasing dimorphism as one goes east and south from west-central South-West Africa. Within races, figures are naturally less reliable since the numbers are smaller, but variation is shown by the following populations of *garrula*:

Klaver-Vanrhynsdorp (5 ♂♂, 5 ♀♀) . ♂, 164.4; ♀, 148.2 = 90%

Calvinia (7 ♂♂, 3 ♀♀) . . . ♂, 163.3; ♀, 142.3 = 87%

Brandvlei (*bushmanensis*) birds give:

Brandvlei (11 ♂♂, 8 ♀♀) . . . ♂, 159.0; ♀, 149.2 = 94%

showing an approach to equality of size, while *bradfieldi* gives:

20 m. W. of Upington (6 ♂♂, 2 ♀♀) . ♂, 163.0; ♀, 144.5 = 89%

more like the Calvinia population than the intervening one at Brandvlei.

In *macdonaldi*, we can contrast three local populations:

Skietkuil, Murraysburg (15 ♂♂, 7 ♀♀) ♂, 154.3; ♀, 143.2 = 93%

Beaufort West (5 ♂♂, 3 ♀♀) . . . ♂, 157.2; ♀, 154.3 = 98%

Oudtshoorn (6 ♂♂, 1 ♀) . . . ♂, 164.0; ♀, 149.0 = 91%

It will be noticed that Skietkuil males are small—the same size as Beaufort West females.

Other populations for which more or less adequate data exist are the total population of *bathoeni*, all taken within a few miles of one another, and single populations of *baddleyi* and *kalahariae*:

50–60 m. E. of Kakia (5 ♂♂, 8 ♀♀) . ♂, 166.0; ♀, 147.4 = 89%

Kimberley (4 ♂♂, 3 ♀♀) . . . ♂, 161.7; ♀, 144.3 = 89%

Kakia (4 ♂♂, 3 ♀♀) . . . ♂, 165.0; ♀, 148.0 = 90%

These all agree with the neighbouring population of *bradfieldi* in proportions.

Mr. A. N. Rowan, who investigated the wing-lengths statistically, tells me that in the males only *boweni* differs significantly from the average of the species. Among the females, *arenaria* and *macdonaldi* may be significantly different. In all races except *macdonaldi*, the differences between male and female are highly significant; in *macdonaldi*, the difference may be significant. Note that the statistical analysis of wing-measurements confirms the conclusion drawn from Macdonald's 'size index' that sexual dimorphism is less marked in *macdonaldi* than in the other races.

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TABLE I

NAMES USED FOR RACES OF *Certhilauda albofasciata*

Race (<i>those in heavy type recognized in this study</i>)	Roberts (1940) and Vincent (1952)	Meinertzhagen (1951)	Macdonald (1953)
albofasciata Lafres. .	<i>albofasciata</i>	<i>albofasciata</i>	<i>albofasciata</i>
<i>calviniensis</i> Rbts. .	<i>calviniensis</i>	(= <i>albofasciata</i>)	(= <i>albofasciata</i>)
garrula Smith . .	—	—	<i>garrula</i>
alticola Rbts. . .	<i>alticola</i>	<i>alticola</i>	<i>alticola</i>
subpallida Rbts. .	<i>subpallida</i>	(= <i>alticola</i>)	<i>subpallida</i>
bradfieldi Rbts. .	<i>bradfieldi</i>	<i>bradfieldi</i>	<i>bradfieldi</i>
arenaria Rchw. . .	<i>arenaria</i>	<i>arenaria</i>	<i>arenaria</i>
<i>barbiensis</i> Rbts. .	<i>barbiensis</i>	(= <i>arenaria</i>)	(= <i>arenaria</i>)
<i>namibensis</i> Rbts. .	(= <i>boweni</i>)	<i>namibensis</i>	(= <i>boweni</i>)
boweni de Schauen. .	<i>boweni</i>	<i>boweni</i>	<i>boweni</i>
bushmanensis Rbts. .	<i>bushmanensis</i>	(= <i>boweni</i>)	(= <i>garrula</i>)
erikssoni Hart. . .	<i>erikssoni</i>	<i>erikssoni</i>	<i>erikssoni</i>
kalahariae O.-Grant .	<i>kalahariae</i>	(= <i>erikssoni</i>)	<i>kalahariae</i>
meinertzhageni Macd. .	—	—	<i>meinertzhageni</i>
<i>robertsi</i> Macd. . .	—	—	<i>robertsi</i>
obscurata Hart. . .	(extra-limital)	<i>obscurata</i>	(extra-limital)